



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 972E-84  
 UNIQUE ID NUMBER: 01P18RR105  
 COMBUSTOR: Phase5 Tiled  
 ENGINE TYPE: TF

BYPASS RATIO: 8.4  
 PRESSURE RATIO ( $\pi_{\infty}$ ): 38.7  
 RATED THRUST ( $F_{\infty}$ ) (kN): 345.9

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>∞</sub> (g/kN) or SN	0.2	17.4	54.2	8.3
AS % OF ORIGINAL LIMIT	1.0	14.7	46.2	49.4
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			57.7	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			64.2	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			71.0	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			80.3	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>∞</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.672	0.01	0.32	39.78	6.1
CLIMB OUT	85	2.2	2.210	0.11	0.31	30.36	6.4
APPROACH	30	4.0	0.735	0.07	1.10	12.23	3.2
IDLE	7	26.0	0.258	0.04	13.00	5.51	0.6
LTO TOTAL FUEL (kg) or EMISSIONS (g)			983	60	5557	17699	-
NUMBER OF ENGINES				3	3	3	3
NUMBER OF TESTS				6	6	6	6
AVERAGE D <sub>p</sub> /F <sub>∞</sub> (g/kN) or AVERAGE SN (MAX)				0.2	16.1	51.2	7.1
SIGMA (D <sub>p</sub> /F <sub>∞</sub> in g/kN, or SN)				0.1	1.7	1.9	2.7
RANGE (D <sub>p</sub> /F <sub>∞</sub> in g/kN, or SN)				0.13-0.24	14.64-17.93	49.39-53.2	5.2-9

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	99.7-101.9
TEMPERATURE (K)	276.6-286.7
ABS HUMIDITY (kg/kg)	0.00243-0.01133

### FUEL

SPEC	
H/C	1.88
AROM (%)	18.2

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce  
 TEST LOCATION: Derby  
 TEST DATES: 17/10/2003-26/04/2016

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

- Data from Certification Report EDNS01000588914 Iss 1
- Certification in accordance with Part III, Chapter 2, of Amendment 8 of ICAO Annex 16 Vol. II.
- NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements: x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)